DC/DC Converter

PV15-2GBxx Series

MORNSUN®

15W isolation DC-DC converter with ultra-wide, ultra-high 250 - 2200VDC input for Renewable Energy

RoHS

FEATURES

- Ultra-wide 250 - 2200VDC input voltage range (Transient 2300VDC last for 30s)
- Operating ambient temperature range: -40℃ to +85℃
- High I/O isolation voltage up to 5000VAC
- High reliability, efficiency up to 83%
- Input under-voltage protection, input reverse polarity protection, output short circuit, over-current, over-voltage protection
- Operating altitude up to 5000m
- Design refer to UL1741, EN/IEC62109, IEC62477

PV15-2GBxx is a regulated DC-DC series converter with an ultra-wide and ultra-high DC input of 250-2200VDC, which design based on standard of UL1741, EN/IEC62109, IEC62477. The products feature high efficiency, high reliability, high insulation and a high level of safety protection. It is widely used in renewable energy industries, such as photovoltaic inverter, energy storage systems, charging pile, industrial control. The converters provide multiple protection features and guarantee stable and safe operating environments even under abnormal working conditions.

Selection Guide

Certification	Part No.	Output Power (W)	Nominal Output Voltage and Current (Vo/Io)	Efficiency at 800VDC (%) Typ.	Capacitive Load (μF) Max.
/	PV15-2GB12	15	12V/1.250A	78	2000
	PV15-2GB24		24V/0.625A	83	1000

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Transient (30s)		--	--	2300	VDC
			250	--	2200	
Input Current	250VDC		--	--	0.12	A
	800VDC		--	--	0.03	
	1500VDC		--	--	0.016	
Inrush Current	250VDC	Cold start	--	30	--	
	2000VDC		--	140	--	
Input Under-voltage Protection	Under-voltage protection start		120	--	180	VDC
	Under-voltage protection release		180	--	250	
Input Reverse Polarity Protection			Available			
Start-up Delay Time*			--	2	3	s
External Input Fuse			2000VDC/2A, required (brand: adler models: A901200b00 base models: BH300-01)			
Hot Plug			Unavailable			

Note: *Continuous start time < 15s.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	All load range		--	±1	±1.5	%
Line Regulation	Rated load		--	±0.25	±0.5	
Load Regulation	800VDC		--	±0.25	±0.5	
Ripple & Noise*	20MHz bandwidth (peak-to-peak value)	250-1800VDC	--	--	150	mV
		1800-2200VDC	--	--	200	
Stand-by Power Consumption	250VDC		--	--	1	W
	800VDC/2200VDC		--	--	3	
Temperature Coefficient			--	±0.02	--	%/℃

Short Circuit Protection			Hiccup, continuous, self-recovery			
Over-current Protection			120% - 500% Io, self-recovery after fault conditions is removed			
Over-voltage Protection	12V		≤20V	Output voltage clamp		
	24V		≤30V			
Minimum Load			0	--	--	%
Hold-up Time	1000VDC, full load		--	20	--	ms
Note: *The "Tip and barrel method" is used for ripple and noise test, output parallel 10uF electrolytic capacitor and 0.1uF ceramic capacitor, please refer to PV Converter Application Notes for specific information.						

General Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input - output	Electric strength test for 1min., leakage current <5mA		5000	--	--	VAC
Insulation Resistance	Input - output	Test voltage: 500VDC		100	--	--	MΩ
Operating Temperature				-40	--	+85	℃
Storage Temperature				-40	--	+85	
Storage Humidity		Non-condensing		--	--	95	%RH
Output Power Derating		Operating temperature derating	-40℃ to 0℃	0.75	--	--	%/℃
			+55℃ to +70℃	2.00	--	--	
			+70℃ to +85℃	3.33	--	--	
		Input voltage derating	250 - 300VDC	0.20	--	--	%/VDC
			2000 - 2200VDC	0.10	--	--	
		Altitude derating	2000 - 5000m	6.70	--	--	%/Km
Safety Standard				Design refer to UL1741, EN/IEC62109-1, IEC62477			
Safety Class				Class II			
MTBF		MIL-HDBK-217F@25℃		≥300,000h			

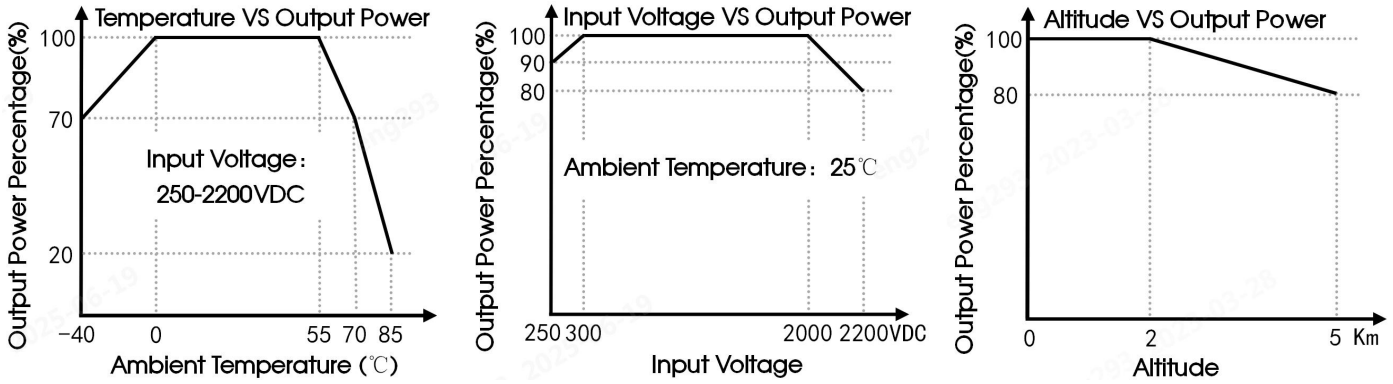
Mechanical Specifications

Case Material	Metal
Dimensions	89.00 x 63.50 x 25.00mm
Weight	210g (Typ.)
Cooling Method	Free air convection

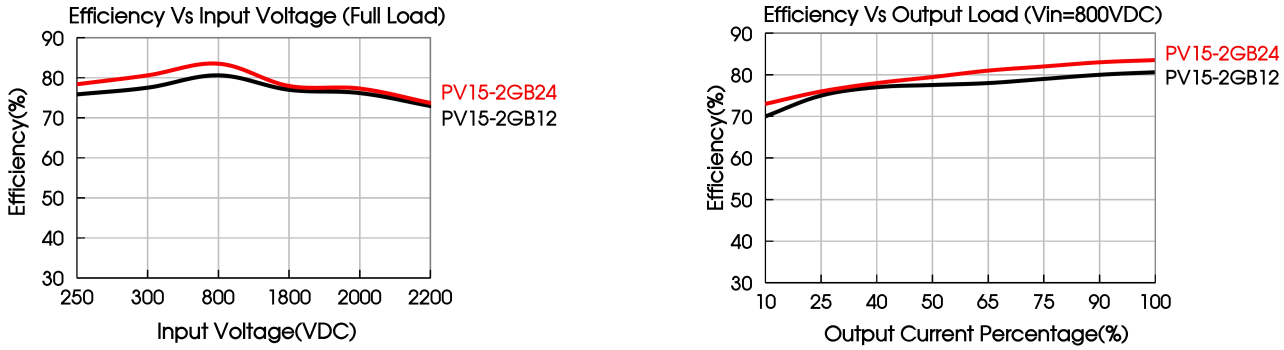
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (See Fig. 2 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A	
	EN61000-6-4			
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria A
	RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	Perf. Criteria A
	Surge	IEC/EN61000-4-5	Line to line ±2KV	Perf. Criteria A
	CS	IEC/EN61000-4-6	10Vr.m.s	Perf. Criteria A
	PFMF	IEC/EN61000-4-8	30A/m	Perf. Criteria A
	EN55035, EN61000-6-2			

Product Characteristic Curve



Note: 1.With an DC input between 250-300VDC/2000-2200VDC, the output power must be derated as per temperature derating curves;
2.This product is suitable for applications using natural free air cooling; for applications in closed environment please consult Mornsun FAE.



Design Reference

1. Typical application

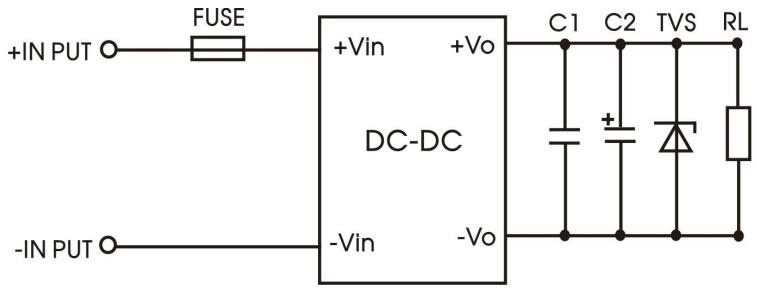


Fig. 1

Part No.	FUSE	C1(μF)	C2(μF)	TVS
PV15-2GB12	2000VDC/2A, required (brand: adler models: A901200b00 base models: BH300-01)	1μF/35V	47uF/35V	SMBJ20A
PV15-2GB24				SMBJ30A

2.EMC compliance recommended circuit

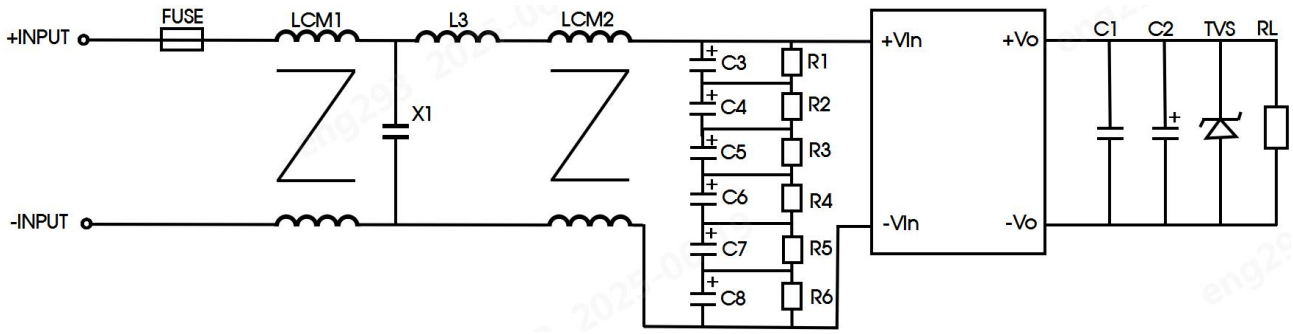


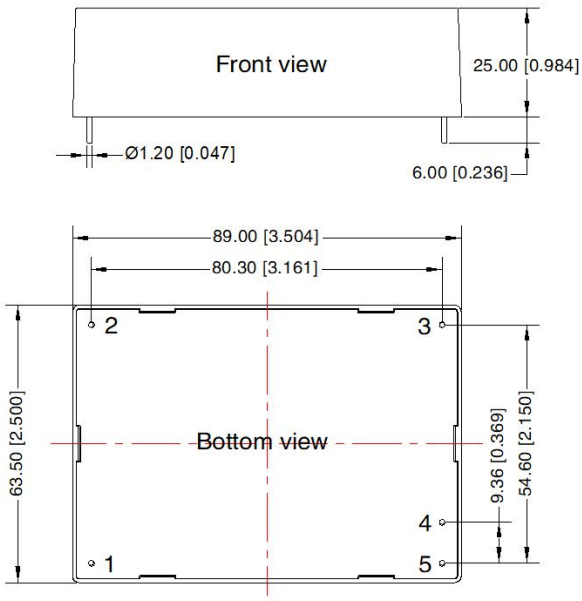
Fig 2: EMC application for higher compliance requirements (output parameters are show in Figure 1)

Component	Recommended value
FUSE	2000VDC/2A, required (brand: adler models: A901200b00 base models: BH300-01)
LCM1, LCM2	20mH/1A（F-class three-layer insulated wire） (recommended to use MORNSUN's FL2D-10-203B)
X1	105K/2200V
L3	330uH/1A
C3, C4, C5, C6, C7, C8	10uF/450VDC
C1	1μF/35V
C2	47uF/35V
R1, R2, R3, R4, R5, R6	1MΩ/2W

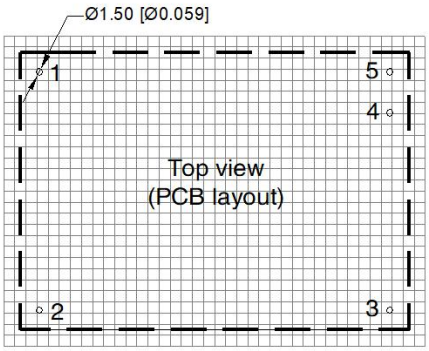
2. For additional information please refer to application notes on www.mornsun-power.com.

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]



Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	–Vin
2	+Vin
3	NC
4	–Vo
5	+Vo

⚠WARNING:
1. CAUTION: "To reduce the risk of fire, connect only to a circuit provided with 4 amperes maximum branch-circuit over-current protection in accordance with the National Electrical Code, ANSI/NFPA70."
2. WARNING: REPLACE ONLY WITH THE SAME RATINGS AND TYPE OF FUSE.
3. DANGER — HIGH VOLTAGE.

AVERTISSEMENT:
1. Avertissement: Pour réduire le risque d'incendie, veuillez connecter uniquement à des circuits de dérivation avec protection contre les surintensités conformes au code électrique national ANSI/ NFPA 70.
2. AVERTISSEMENT : N'UTILISER QUE DES FUSIBLES DE MÊMECALIBRE ET DE MÊME TYPE QUE LE FUSIBLE DORIGINE.
3. DANGER ： HAUTE TENSION.

Note:
1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58220021;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75% with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
7. If the final product application is connected to a photovoltaic array, the array needs to be grounded and the voltage between the positive and negative poles of the product shall not be greater than 2200VDC.

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